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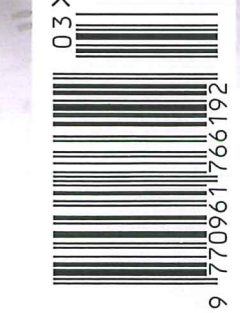


7 PAGES OF LETTERS - THE BEST WINS A PAIR OF KEF Q100 LOUDSPEAKERS! (UK ONLY)

New Tube

Audio Research use a new valve – the KT150 – in their recently introduced Reference 75 SE tube amplifier. Noel Keywood takes it for a ride.

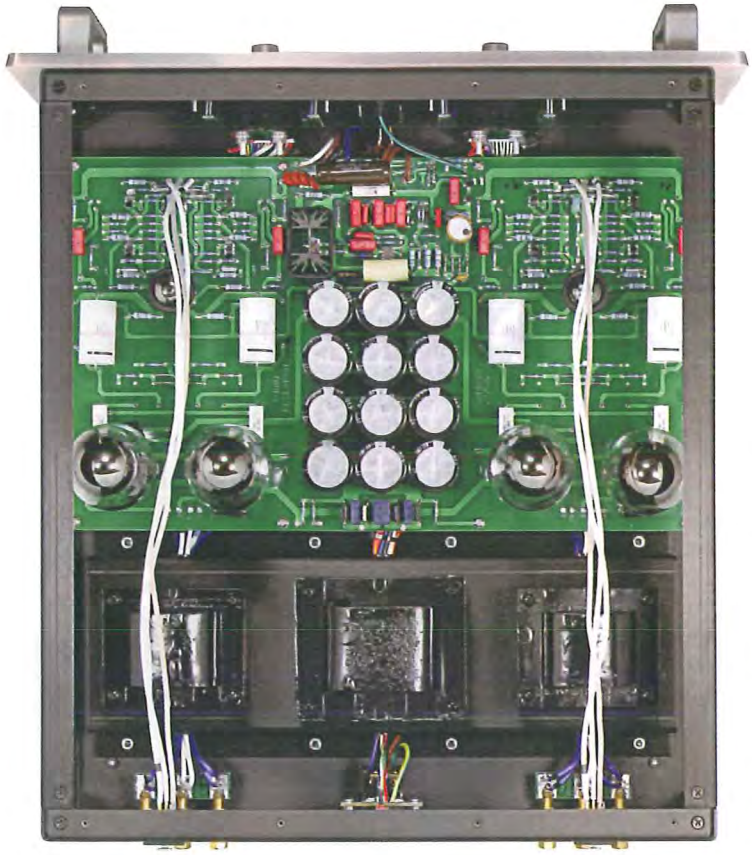
Audio Research have a house sound that's punchy and exciting – and they stick to it. I guessed their new and visually engaging Reference 75 SE power amplifier would drive their view of the tube (valve) amplifier forward, in much the same way as a Mack truck drives forward. Yes, I am alluding to the sound, but not in a facetious way. If you want an amplifier with eye-popping dynamics, speed and punch, think Audio Research. I love 'em, so I strained at the bit to get this new Reference in for review.

The 75 SE is – physically – a very big amplifier, with a big price ticket of £8698. Yes, even I was surprised at this, since a pair of KT150 valves in push-pull can be had elsewhere for a lot less. You have to listen to an Audio Research to see why, for some, it will be justified; the rest of us just have to dream, and drool.

Although very big, this amplifier isn't super heavy, weighing in at a just-liftable 21kgs. For its size - 48cm wide, 22cm high and 50cm deep – it seems almost flyweight, but that's only because Audio Research don't use massive output transformers, something I'll get to later. The chassis is sturdy, all the same, and well finished, with massive grab handles at the front. The fascia panel is exactly 19in wide to fit a 19in rack, whilst the rear casework is 44cms wide, needing 17.5in clearance in a rack.

Then you have of course a pair of lovely illuminated power meters. They adorn the front and – to me at least – animate the box, turning it into something that has visual interest in the home. Perhaps that's because I like looking at meters, seeing what they have to tell and – er – not everyone feels the same perhaps!

But output meters are a useful thing to have. LED displays better show short term peaks, admittedly, but big illuminated meters like this



At bottom sit output transformers either side of a mains transformer, all with an industrial black finish. Above them pass overhead input lines (white). At centre left and right you can see the KT150 power output valve pairs, with big white coupling capacitors just above. At top sits the discrete transistor input circuitry, and centre banks of power supply capacitors.

still show average music level well enough to give useful warning of overload. Not that that is likely with 75 Watts per channel of power on tap and most people will, I suspect, wonder why the needles stay at such a low level over on the left side of the scale, because little more than 5 Watts is needed in most homes and systems to play at normal volume and this level is indicated just 25% up the scale. Centre scale is 20 Watts and that is very loud.

Another use for these meters is to show bias level, because bias on these amp needs occasional adjustment, possibly every few months under heavy use, as the valves slowly age.

I haven't used KT150 power valves (tubes) for any time in a 'fixed bias' amplifier like this to know from experience how they age, but as they are a new audiophile design and very sturdy, with huge power dissipation, it is likely they'll age slowly, making this a very occasional process. The heater and anode of any valve degrade as their surface coatings (e.g. barium) wear away, in much the same way as light bulbs wear out, the reason power valves have a life of around 2000hrs or so. Bias has to be adjusted to compensate, in order to keep the right amount of current passing through the valve. So an occasional twiddle is required.

"a spectacular looking and sounding amplifier - one not to be missed"

Fixed bias is used because it gives more power than the popular 'auto-bias' circuit arrangement that makes bias adjustment unnecessary, but there's also an argument about sound quality in here. It's commonly claimed auto-bias sounds soft and fixed bias hard, to put it simply. And I'd go along with that as a broad outline of the difference. I suspect Audio Research choose the inconvenience of 'fixed bias' because it is part of what they want to achieve in their particular house-sound.

I found bias setting a bit fiddly since you have to fish around inside a hole on the front panel to find the screw head of an adjuster, then twiddle it with a plastic 'screwdriver' style tool, the like of which I haven't seen for a long time, since using an identical object to adjust the ferrite cores of RF and IF coils in my home-built communications receivers.

Apart from this little performance, the Reference 75 SEs otherwise demands little user involvement. The power switch is a sturdy front-panel rocker style device and power connects at rear through a three-prong, U.S. style connector, not a European-style IEC connector.

The meter lights can be switched off, but the switch for this is on the rear panel.

Like most power amps, there is no volume control, the preamplifier must have this. Unusually, though, there are no unbalanced phono-socket inputs either; the Reference 75 SE accepts only a balanced input through an XLR connector, so it must be driven by a preamp with balanced outputs. Needless to say, Audio Research preamps have such outputs, as do many other preamps these days, especially in expensive high-performance systems. Why? Because they eliminate hum loops, provide noise cancellation and also provide screening for both signal conductors, resulting in better sound quality.

The use of balanced inputs and, presumably, all-balanced circuitry, eliminates the need for an internal phase-splitter valve, cutting out a whole stage. Hence the amplifier uses just two KT150 power valves, fronted by rugged 6H30 double-triodes working as driver valves. Like most Audio Research amplifiers, however, there are solid-state gain stages in front of the 6H30s, making this a hybrid design. The use of solid-state up-front lowers noise and measurement confirmed the Reference 75 SE is very quiet.

The new-design KT150 power valves this amplifier uses update and effectively replace the KT120s that

went before them. The 120s were a relatively recent update of the post-war British GEC KT88 and a rather crude one made by a factory in East Europe. Whilst the KT88 sounded great – fast and clean, rather than lush and warm – the KT120 generally sounded clanky, to the point where I chose not to review KT120 amps. They despoiled the breed.

Happily, someone must have felt the same and decided better was possible, hence the new KT-150. This is not a cheap clanker like the KT120. With a distinctive gherkin-like glass envelope and strong, non-microphonic internal electrode structure, plus large high-power dissipation anodes, the KT150 is a sophisticated build and was selling at £90 apiece (a KT88 is £40), but in the amplifiers I have reviewed to date it offers a smooth and sophisticated sound that justifies this price.

Audio Research were wedded to using the American 6550, a rugged tetrode much like the GEC KT88, but they've obviously been convinced by the charms of the KT150 so now it has popped up in their expensive Reference amplifiers. I'll just make the point here that unreliable valves are a persistent background problem in valve amp manufacturing – and one best avoided. In World Audio Design, we once had an entire batch of KT88s from East Europe that failed prematurely, causing a wave of complaints and returns. To avoid such a thing, so preserving their reputation and the cost of dealing with such a problem, is almost surely why Audio Research stuck with the un-lovely but workmanlike 6550 in the past. It also suggests that they are happy with the KT150 in this respect.

A 6H30 driver double triode, well known for ruggedness combined with good sound. It has anti-microphony damping rings on here.

So that's just a little aside to explain what you are getting here and why. Valves aren't transistors. Each one has its own history and particular attributes, as well as its own sound. So the valves Audio Research use in their new Reference 75 SE say much about the company's design intentions in this product, as well as what buyers can expect from it.

KT150 power output valves have very large anodes (grey) to dissipate heat, allowing them to handle high power.

And finally, those unlovely black transformers you can see in shots of the Reference 75 SE internals. Audio Research manage great results from relatively small output transformers, the smaller black blocks either side of the larger central mains transformer. Quite how they do this I do not know, but you can use feedback, high-quality core material and tertiary windings to get "small stacks" whilst maintaining high performance – and this they do. The result is full power and low distortion at bass frequencies, an area where valve amplifiers traditionally struggle. The use of feedback also provides useful loudspeaker damping to lessen soggy bass, although all this does depend on the loudspeaker used and its own level of acoustic damping, I find. Rear-mounted, gold-plated loudspeaker terminals for 8 Ohm and 4 Ohm loudspeakers are fitted and they accept bare wires, spade plugs or 4mm banana plugs.

SOUND QUALITY

The Audio Research came run in but we put 40 hours on it in any case, and gave it a 30 minute warm up before listening, as with all valve amps. They were used with Quadral's superb Chromium Style 8 loudspeakers featured in this issue, and Tannoy Westminster Royal GR loudspeakers, through Black Rhodium cables. The source was an Oppo BDP-105D Blu-ray with its ESS Sabre32 DAC and internal volume control, connected via balanced cables. I have stopped using CD altogether now, becoming too aware of distortion, instead using high-resolution files played by an Astell&Kern AK120 hooked up to the BDP-105D through an optical digital cable. Even CD rips sound better than the original disc when played by this system, likely due to re-clocking in the transcription process.

Classic Rock in the form of Fleetwood Mac's 'Go Your Own Way' (24/96) teased out essential elements of the Reference 75 and, in particular, its ability to make the timbral qualities of instruments more obvious than that of most amplifiers: Mick Fleetwood's kick-drum suddenly had a skin being beaten by a pedal, instead of existing as an amorphous background thud, as I so commonly hear it. The Reference SE injected a sense of character to instruments, removing the bleached quality common to so many of today's transistor amplifiers. It's a fast amplifier too, catching the speed

The rear panel carries balanced XLR inputs at top, but not unbalanced phono socket inputs, so only pre-amplifiers with balanced outputs can be used – but most have them these days. Note the big power input socket; this is not an IEC design, but a unique U.S. socket. Gold plated loudspeaker terminal posts accept spades, bare cable or 4mm plugs. Power matching is to 8 Ohm and 4 Ohm loudspeakers.

of Fleetwood and his inflections. Similarly, the slow kettle drum strikes in 'Jupiter', from Holst's 'Planets', had delicious dynamic presence and horns called out with a shiny rasp to them.

The Reference 75 SE was airy and spacious in its portrayal of the soundstage, a property supported well by the ribbon tweeter of Quadral's loudspeakers, making clear the position of instruments within the London Symphony Orchestra, playing 'Jupiter'.

Audio Research don't do 'soft and warm', as I mentioned earlier, and this power amplifier has a light open quality about it; even the 'dark' recordings of Diana Krall seemed to have a window opened onto them, letting light into the shadows. Bass was relatively strong through our giant Westminsters but milder through the Quadrals, although still fast and punchy. - Queen's 'Radio GaGa' (24/88.2) opening synth drum sequence lighting up our listening room with a sense of tightly controlled power, sharply timed as you'd hope from a machine. Freddie Mercury hung above the Quadral Chromium Style 8s caught in a crisp, clear light; the Reference 75 SE isn't bright but it has a sparkling clarity.

CONCLUSION

The new Audio Research 75 SE is a spectacular looking and sounding amplifier - one not to be missed. With big illuminated power meters and gorgeously finished casework it is a statement in the home.

Delivering fabulous sound quality from a new-design KT150 valves – or tubes should I say in this case – it's a power amplifier that demonstrates just how good it gets when a tube amplifier is so well honed.

MEASURED PERFORMANCE

The Reference 75 delivered 78 Watts into 8 Ohms and 72 Watts into 4 Ohms from its 4 Ohm tap (1% thd), so its rated output of 75 Watts is accurate, if not conservative. It uses KT150 valves in push-pull running with fixed bias to achieve this.

Distortion was low across the audio band, as valve amps go that is. At 1kHz distortion hovered around 0.1% below 5 Watts output, rising progressively to 0.4% (-1dB below full rated output), comprising low order harmonics – mainly second and third.

In spite of compact output transformers the Reference 75 produced little bass distortion, much like other Audio Research amps, but unlike many other valve amps where core magnetic hysteresis produces third harmonic and eventually magnetic saturation that limits bass power. In contrast to this the Reference 75 delivered full bass power with ease and, at low powers, very little distortion.

As power rose, so did distortion, reaching 1% at full power – still a reasonable figure as valve amps go. Since at 5 Watts and below bass distortion measured less than 0.2% the amp will sound clean in practice. High frequency distortion was under good control also, again measuring 0.2% or less below 5 Watts, and 1% at full power, mostly second harmonic – see our analysis at 1 Watt output, 10kHz.

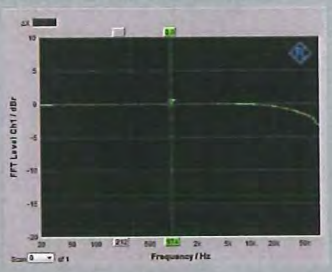
Frequency response rolled down slowly above 20kHz to a -1dB point at 35kHz, from both 8 Ohm and 4 Ohm outputs, into 8 and 4 Ohm loads respectively of course.

An unusual discrete, balanced transistor input stage ensures low noise of -105dB; there is no unbalanced phono input and therefore no phase splitter stage in this amplifier – it is all-balanced.

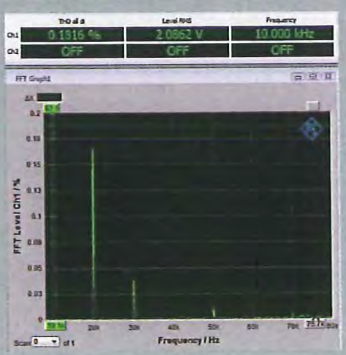
The Audio Research Reference 75 power amplifier measured well in all areas, in keeping with the company's standards. **NK**

Power	**75 Watts**
Frequency response	**4Hz- 30kHz**
Separation	**88dB**
Noise	**-105dB**
Distortion	**0.1%**
Sensitivity	**1.4V**
Damping factor	**4**

FREQUENCY RESPONSE



DISTORTION



AUDIO RESEARCH REFERENCE 75 SE £8698

OUTSTANDING - amongst the best.

VERDICT
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FOR
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- standard of finish
- sound
- power meters

AGAINST
- very big
- no unbalanced inputs

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